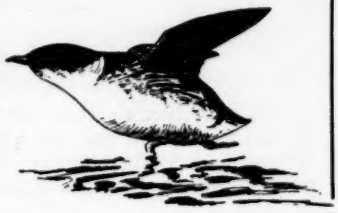
The MURRELET



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THE GROWTH OF THE GLAUCOUS-WINGED GULL

ZELLA MCMANNAMA SCHULTZ

PART II

PTERYLOGRAPHY

The feather tracts of the gull require some description. It should be explained that in the gull there are no distinct apteria, for all body surfaces are covered with feathers, many of a downy nature. The alar, caudal and capital tracts are similar to those of most birds.

The spinal or dorsal tract originates at the nape, where it becomes distinguishable from the capital tract, and ends at the tail. It is divided into two relatively distinct parts. The anterior half lies between the shoulders and is bifurcated obliquely outward, each branch terminating close to the posterior ends of the scapular (humeral) tracts. It thus assumes the shape of an inverted Y. Located between the arms of the Y is the posterior half of the spinal tract, also in the form of a Y, but with the arms tapering to points between the arms of the anterior portion. This part of the tract ends at the uropygium.

The scapular or humeral tracts, as in most birds, lie across the upper part of the humerus, paralleling the scapula. The femoral tracts lie between the posterior portion of the thigh and the sides of the tail, but terminate before reaching the anus.

Anteriorly the ventral tract is continuous with the capital tract. Just anterior to the arms of the furcula it is considerably narrower, and is forked, leaving a patch of down in the area between the furcular arms. Each branch becomes wider at this depression, and is bifurcated just beyond the beginning of the keel. One portion, the lateral, ends just in front of the thigh in a finger-like elongation. The medial portions are narrow, one on each side of the keel, becoming wider at the posterior end of the keel, and terminating abruptly at the level of the anus. There are patches of down between all of these main feather tracts.

An experimental feather count on a six-month old bird yielded a total of 9,452 feathers, which included only feathers with defined shafts. Wings, 2,100; scapulars, 276; flanks, 160; back and upper tail coverts, 489; head, neck and throat, 4,776; rest of underparts, 1,639; rectrices, 12.

ENDYSIS

SCAPULARS

The scapular feathers are the first to appear. In 11 specimens it was found that the first feathers may appear as early as six days of age, or as late as eleven days. After the eleventh day, no birds were found which did not show some scapulars. Unsheathing usually occurs about the eleventh day, and the latest day on which no unsheathing was found was the twelfth day. In one specimen the feathers were sufficiently developed to form a solid patch on the fourteenth day.

PRIMARIES

The full primaries, 10 in number, make their appearance a day later than the scapulars. In one bird the primaries showed through the skin on the seventh day. In the birds examined for this character no birds were found without some evidence of primaries after the ninth day. Unsheathing was first noted on the fifteenth day, and after this age none were found which had not begun to unsheath. Although their growth is fairly rapid, they do not reach

full length until the birds are able to fly, at about seven weeks of age. At the age of 62 days our captive had primaries 265 mm. in length. (See Table 10).

Secondaries

The secondaries, 17 in number, appear a day or two later than the primaries. They were first noted on the ninth day, and the first unsheathing was observed on the thirteenth day. They were 142 mm. in length at 62 days in our captive.

Rectrices

The rectrices, 12 in number, were first noted on the twentieth day as pin feathers. At the age of 23 days one bird had rectrices 12 mm. unsheathed, but the rectrices grow much more slowly than the remiges, and total adult length is not reached until some time after the bird is able to fly. They had reached a length of 153 mm. by 62 days in our captive, which is full adult length.

Upper Wing Coverts

The upper wing coverts appear at about the same time as the secondaries. They were first recorded on the ninth day. Middle and greater coverts were specifically noted as pin feathers in one specimen on the twelfth day, and first unsheathed in one specimen the twelfth day, in another on the sixteenth day.

Ventral Tracts

The feathers in the ventral tracts appear almost simultaneously with the scapulars, the breast and sides developing visible pin feathers on the day following the appearance of the scapulars. Unsheathing ranged from the ninth day in one bird to the sixteenth day in another. The abdominal portion, however, ay not develop feathers until several days later than the breast and sides. Pin feathers were noted in this area on one specimen at fourteen days.

Dorsal Tracts

The upper dorsal or spinal tract feathers begin to appear somewhat later than the scapulars, and were unsheathed at the tip in one specimen on the thirteenth day. The lower dorsal tract feathers do not become apparent until much later, and in our captive bird, began to unsheath at 26 days of age.

Femoral Tract

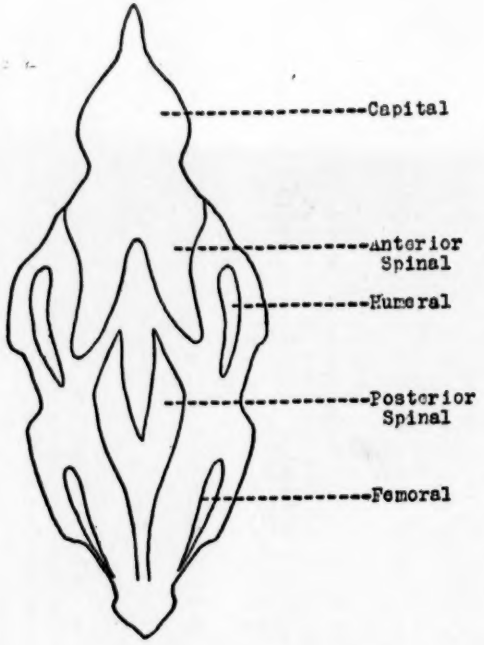
The femoral tract feathers appear at the same time as the breast and side portions of the ventral tract. These feathers develop at the same rate as the latter, and were unsheathed about 20 mm. on th twenty-sixth day in our captive bird.

Capital Tract

Endysis of the body is well under way before the head begins to show any signs of teleoptiles. The bird is able to fly before the last of the down disappears from the head. Feathers first appear on the auricular area, then on the crown and forehead. As these feathers develop they form three distinct stripes from the bill to the occiput. Down remains longest on lines above the eyes, on the throat, the angles of the jaws, and the nape. A 37-day-old bird had a complete coat of feathers except for throat and nape, which were still downy. A 43-day-old bird had the natal down completely replaced by the teleoptiles.

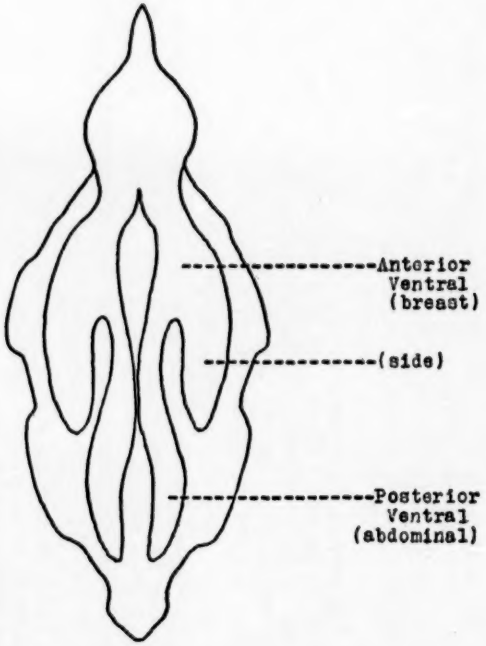
Pettingill (1946:178-182) states that in the altricial birds the first teloptiles appear in the dorsal pterylae, on the alar, humeral and spinal tracts, then on the rest of the dorsal pterylae, and finally on the ventral pterylae. In precocial young of land birds the first teleoptiles appear on the alar, scapular and caudal pterylae. In some of the *Galliformes* they are evident at hatching, and may even be unsheathed. In the young of aquatic birds the ventral pterylae appear

Plate I



Dorsal feather tracts of L. glaucescens.

Plate II



Ventral feather tracts of L. glaucescens.

first, then the humeral and caudal pterylae. In precocial land birds the last teleoptiles to appear are those of the capital pterylae, cervical region and pelvic region. In aquatic birds the last to appear are the capital, pelvic and alar teleoptiles, and the remiges and their coverts are the farthest behind in development. This was observed in a juvenile Mallard, and Johnson (1938:530) shows this to be partly true of the Atlantic Murre, which has well-developed coverts but no remiges when it takes to the water.

In the *Lari*, feather development resembles the pattern for land precocial birds, as might be expected, considering their relationship to the shorebird group. They are unlike the *Galliformes* in that the remiges are not ready for use as soon, and the caudal pterylae are not in evidence until after most of the other tracts have developed feathers. In general, the pattern of development is similar to precocial land birds rather than aquatic birds.

Physical and Psychological Development

At the time of hatching, the young gull is weak and awkward. At first it spends most of its time lying flat on the ground or sitting on its tarsi, and usually is not able to rise and walk until it is from 24 to 48 hours old. Until that time it creeps about upon its tarsi. It is, however, able to hold its head erect almost as soon as it is hatched, and by the time the down is dry, which requires several hours, it is able to peck with considerable accuracy at moving objects. At this time the bird responds very quickly to an offer of food. One young bird hatched in the laboratory was eating before its down was fully dry, and another that hatched about 2:30 p. m. was reaching for and eating food by 8:00 a. m.

The young utter two calls, one a thin "Pee-eep" which serves as both a location call and a food call, and a staccato "Ka-ka-kak!" which is identical with the warning cry of the adult. These sounds are often uttered by birds still in the egg.

Temperature Control

A young bird about three hours old, after being in a room where the temperature was 25.5°C for five minutes, showed a gullet temperature of 36.5°C. Another bird of the same age, in a temperature of 29°C had a gullet temperature of 36°C. After five minutes at an external temperature of 8.5°C, this bird had a gullet temperature of 32°C. In sunlight at 31°C the bird had a temperature of 37°C. In very hot sunlight a day-old bird had a temperature of 38.5°C, was panting, and moved about restlessly. A six-hour old bird, struggling in the hot sun for five minutes, had a temperature of 39.5°C. A seven-day-old bird under similar conditions also showed 39.5°C. This is the highest temperature found in the juvenile gulls. The gullet temperature of a breeding adult shot on Colville Island in 1951, not over 3 minutes after death, was also 39.5°C.

The apparent suffering of the bird in the hot sun (also shown by young birds removed from their hiding places on sunny days) is possibly the reason why young desert the nest soon after hatching. The adults shade the young when they are present. When they are absent the young find the nearest shade and crouch in it.

Behavior During Development

The young gulls, while not actually fed by bill contact, take food from the adult as it is regurigitated, while they are still very hungry. After their hunger is lessened they may pick the remaining food from the ground. In each is a particular "feeding place" where the food is delivered by the adults.

During the day the young are more or less in evidence, standing about, near or in the shadow of their parents. When danger threatens, however, the adults leave their territories, and the young respond to the alarm notes of the

adults by hiding in crevices or under vegetation. While observing from a blind, I noted the response of young to these notes from the adults. The young, less than a week old, were in hiding in crevices of the rocks. The parents were suspicious of the blind, and remained at a distance of about 25 or 30 feet. At intervals the young, apparently wishing to be with their parents, emerged from hiding and started across the open space. As soon as the young approached the front of the blind, a sharp, warning "Ka-ka-kak!" of a parent bird would be sounded, and the young would run back to their hiding places. I saw this occur several times, and each time the young scurried back to their crevices when the old bird sounded its emphatic warning.

Normally, unless disturbed by a too close approach, or actual handling, the young will remain "frozen" in their hiding places. However, when they are half grown or older, they frequently run when too closely approached. Young gulls have poor muscular coordination and a poor sense of direction. They often run into obstacles, and accasionally run over the edge of a cliff and fall into the water. They are seldom injured, however, and if they have fallen into the water, usually swim away. Even newly hatched young can swim well if forced to do so. Young are occasionally drowned by hiding under rocks below high tide, from which they are unable to escape when the tide returns. Older young birds often leap into the water to escape when the tide frequently swim away into a rapid tide and are carried far from shore. One young bird which was able to fly somewhat was banded on Hall Island July 21 and found dead on Shaw Island, about ten miles away, on July 23. This young bird must have been frightened into the water and was unable to return because of the tidal currents. However, unless there are strong currents, the birds usually return to the island. Even when there are tidal currents, this does not always result in tragedy, as in one instance an adult bird flew out and alighted beside the young one and began to swim with it at an angle to the current. In a few minutes the adult had guided the young bird out of the current and back to the island shore. In another instance young birds were driven back by two adults before they reached the tide, the adults pecking the young repeatedly until they changed course and returned to shore.

During egg-laying and incubation the adults defend their territory against any encroachment by another gull, even when driven from it themselves by the close approach of an observer. Within this area the young usually remain after hatching. One brood under observation moved about thirty feet, beyond the nesting territories of two neighboring families.

The chief cause of mortality to the young in most cases is their inability to distinguish between their parents and other gulls. It is evident that in some manner the adults appear to recognize their own young, and wandering young are often ruthlessly killed if they enter another pair's territory. The territory of a pair under observation included a large, overhanging flat rock which sheltered the brood. Two weeks later another pair hatched a brood of three fifteen feet away. A few days later two of these chicks were found beaten to death at the edge of the rock, and two days later the third member of this brood was also found dead there.

By the time the young are five weeks old they may attempt to fly if disturbed. An adult bird will almost certainly knock a young of this age out of the air before it has gone very far. It is difficult to say why this occurs, unless the adults have some instinctive way of knowing that the young are not yet ready to fly. By the age of 45 days, however, the young can fly very well. At the time of first flight young birds find it necessary to swim back to shore if they landed in the water as they can not rise from the surface. Within a week, however, they are able to take off from the water. The plumage is at first not very water repellent, and becomes saturated very easily. Also, the flight muscles

are not yet full strengthened. This may account for the fact that a take-off from water is then impossible.

The young do much wing exercising before first flight, flapping and springing up and down. Probably the first flight comes when the breeze lifts the bird from the ground, if the bird has not been forced into flight by fear. Our captive had never flown before it was released at the age of 62 days, yet it flew about with ease, and had difficulty only in landing. That it was a capable flyer is proven by the fact that it was seen 75 miles north of the release point six days later.

By the end of the seventh week the young are making extensive flights with the adults, when they can be seen accompanying their parents along the shore. Occasionally groups of young birds circle the area as if exercising. They probably learn to feed by imitating the adults, and soon become independent, although they may associate with the adults for a considerable time after this, and will attempt to beg food from any nearby adult until well into the following winter

Soon after the young reach eight weeks of age, a gradual dispersal movement begins. Juveniles begin to appear about the fish canneries in the San Juan Islands by the last week in August. Perhaps this urge impelled our released captive to migrate. At any rate, a young bird was found dead two months later after landing, on the Wishkah River at Aberdeen, Washington, a flight involving at least 200 miles. Since this bird was only two or three weeks old when banded, it must have left the breeding island rather shortly after attaining independence, and it is likely that it travelled much more than 200 miles in this time.

PARASITES

Adults and young are infested with endoparasites, both cestodes and nematodes. Adults collected during the breeding season from Low Island were heavily infested with tapeworms, although the birds were fat and in excellent condition. A young gull sixteen days of age was passing mature proglottids of an undetermined species of tapeworm. Johnson (1937:383) tells of a downy young Red-breasted Merganser about ten days old which was heavily infested with the tapeworm *Schistocephalus solidus*, some of which were already sexually mature.

Ectoparasites in gulls consist of bird lice of undetermined species and fleas, likewise undetermined. Of these, the flea is far more serious as a pest. and may sometimes account for a very high mortality among the young. On Buck Island in 1949 fleas were found in the nests that were near boulders or deep, dry crevices. They were first noted by the fact that the eggs in these nests were spotted with blood. Some DDT powder was dusted into these nests, and the trouble was ended.

When we returned to Buck Island on July 7-8, 1951, we were able to locate only one of the young birds that had been marked on a previous visit, and 40 young not more than 2 or 3 days old were found dead. In the nests which still held eggs, the eggs were heavily encrusted with blood. The concentration of fleas was much greater than 1949, possibly because of the extremely dry weather. A seething mass of both larvae and adult was present in each nest examined.

A healthy young bird hatched at 4:45 p. m. July 7. By 9:00 a. m. the next morning this bird was so weak that it could not hold its head erect, and its visible membranes were pale ivory in color instead of a healthy pink. It refused to eat. In spite of being force-fed, it lost weight and died four days later. Upon dissection, other freshly dead young birds showed that their systems were almost without blood, even the heart appearing white. Thirty-one young were banded, and this was almost all the living young on the island.

ACKNOWLEDGEMENTS

For guidance in this study I am particularly indebted to Dr. Arthur Svihla, Dr. Arthur A. Martin and Dr. Richard C. Snyder of the Department of Zoology, University of Washington, and to Martha R. Flahaut of the Washington State Museum for her editorial assistance.

I express my gratitude to the staff of the University of Washington Oceanographic Laboratory at Friday Harbor, Washington for the assistance and facilities accorded me in 1948. I owe an especial debt of gratitude to Mr. and Mrs. Richard Lea of Seattle for their cooperation and many kindnesses to me during my work on Lopez Island. The field work in 1951 was supported by a grant from the Frank M. Chapman Memorial Fund, administered by The American Museum of Natural History.

TABLE 10. PLUMAGE DEVELOPMENT OF A CAPTIVE GLAUCOUS-WINGED GULL (1951)

Age (in days)	*Primaries*		*Secondaries*		*Rectrices*
	total length	*unsheathing*	*total length*	*unsheathing*	*total length*
22	50	16	38	15	present
24	68	21	48	16	—
26	81	37	56	30	26
28	97	50	70	40	37
39	185	—	—	—	90
62	265	—	142	—	153

SUMMARY

Part of the San Juan Island population of *Larus glausescens* was studied to determine the size and weight of the eggs, the egg-laying and incubation periods, and the weight loss of eggs during incubation.

Growth of the young was studied in detail one one colony, by measuring and weighing birds of known age. It was found that there is a difference between the relative size of various parts at hatching, and that the growth rate of these parts varies, some reaching adult size much earlier than others.

The process of endysis was studied and the order of feathering was found to resemble that of land precocial birds rather than that of aquatic birds. The young gull has completed endysis by the sixth week and attained independence by the eighth week. Material obtained from birds reared in captivity appeared to be valid, since a comparison showed that the 1951 captive grew according to the normal rate of birds studied in the field. Some observations were made upon behavior of both adults and young during the growth period.

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SOME UNCOMMON BIRDS COLLECTED IN THE CARIBOO PARKLAND BIOTIC AREA OF BRITISH COLUMBIA

Leo Jobin

The following list represents some species collected during the winter and spring of 1950-51 in interior British Columbia. Some of the birds recorded were of very unusual occurence in the Cariboo area, some having never been collected before on the mainland of the Province.

Redpoll, Pigmy Owl, Great Gray Owl, Little Boreal Owl, Gyrfalcon, and many other species of small birds were common around Williams Lake during the winter 1950-51. The snow, at this time was deep and the weather exceptionally cold.

GADWALL *(Anas strepera)*. Alkali Lake, May 31.

GYRFALCON *(Falco rusticollis* (Linnaeus)). Alkali Lake, November 6 and 17.

PRAIRIE FALCON *(Falco mexicanus* (Schlegel)). Alkali Lake, March 26.

BLACK MERLIN *(Falco columbarius sucklei* (Ridgway)). Mile Road, August 26 and March 30.

SEMIPALMATED PLOVER *(Charadrius hiaticula* (Linnaeus)). Cariboo, August 23.

SEMIPALMATED PLOVER (*Charadrius hiaticula semipalmatus*). Cariboo, May 19.

GOLDEN PLOVER *(Pluvialis dominica* (Muller)). Mile Road, October 11 and April 30.

DUNLIN *(Erolia alpina pacifica* (Coues)). Cariboo, October 13 and May 14.

WESTERN SANDPIPER *(Ereunetes mauri* (Cobanis)). Cariboo. May 24.

PIGMY OWL (*Glaucidium gnoma californicum* (Sclater)). Horsefly, January 15 and McIntosh Lake February 23.

GREAT GRAY OWL *(Strix nebulosa* (Forster)). Cariboo. October 13, March 3. Williams Lake. December 30.

RICHARDSON OWL (*Cryptoglaux funerea Richardsoni*) Williams Lake, February 28.

LITTLE BOREAL OWL *(Cryptoglaux funerea* (Linnaeus)). Cariboo, February 5.

RED-BREASTED SAPSUCKER *(Sphyrapicus ruber* (Gmelin)). Chezacut Lake. June 19.

MOCKINGBIRD *(Minus polyglottos* (Linnaeus)). Cariboo. May 18.

BOBOLINK *(Dolichonyx oryzivorus* (Linnaeus)). Cariboo. June 7, 11, and 13.

LAZULI BUNTING *(Passerina amona* (Say)). Williams Lake. July 3 and 13.

HOUSE FINCH (*Capodacus mexicanus solitudinis*). Williams Lake. May 27, 25, and August 21.

ROSY FINCH *(Leucosticte tephrocotis* (Swainson)). Lac La Hache. November 15.

REDPOLL *(Acanthis hornemanni* (Holboell)). Williams Lake. November 14 and 16, and January 20.

TREE SPARROW *(Spizella arborea* (Williams)). Williams Lake. April 7.

CLAY-COLORED SPARROW (*Spizella pallida* (Swainson)). Cariboo. June 9.

GOLDEN CROWNED SPARROW *(Zonotrichia coronata)*. Cariboo. May 10.

LAPLAND LONGSPUR (*Calcarius japponicus alascensis* (Ridgway)). Cariboo. October 24, and November 1, Williams Lake, B.C.

THREE CETACEAN RECORDS FROM BRITISH COLUMBIA

I. McT. COWAN and CHARLES J. GUIGUET

Recent additions to the collections in the Provincial Museum, Victoria, B.C. and the Museum of Zoology, University of B.C., Vancouver, B.C., include two delphinids not before recorded from the Pacific coast of Canada and more complete material of a ziphiid than was previously available.

LAGENORHYNCHUS OBLIQUIDENS Gill *(Striped Dolphin)*

There have been several sight records of dolphins presumed to be of this species. These have been at various places from the Strait of Juan de Fuca to Queen Charlotte Strait, but they have lacked the support of specimen evidence or clearly identifiable photographs.

In June, 1943, a skull of the species (No. 4996 Provincial Museum) was found on beach at Estevan Point, Vancouver Island, by W. R. Hall and sent by him to the Provincial Museum. It is the first specimen record from Canadian waters.

STENELLA EUPHROSYNE Gray *(Long-snouted Dolphin)*

A skull from the beach at Muchalat Arm, Nootka Sound, Vancouver Island, found by Mr. J. G. Mitchell during the winter of 1948 apparently belongs to this species. Dr. Remington Kellogg of the United States National Museum has examined the skull and given us his opinion of its rather peculiar characteristics.

The large brain case and approximately 48 teeth in the upper jaw place it in the genus *Stenella*. Of the known species it is most like *euphrosyne* but has the base of the rostrom narrower by about 20% than in any other specimen of the species measured. However, as little is known of the individual variation in the species this skull may fall within the normal range of the species and is best considered so.

ZIPHIUS CAVIROSTRIS G. Cuvier *(Cuvier's whale)*

This whale has hitherto been known from Canadian waters on the strength of a badly beachworn skull from Fisherman's Bay, Cape Scott, Vancouver Island (Cowan & Hatter, 1950) and a fragmentary lower jaw from Estevan Point, Vancouver Island (Cowan, 1945). The addition of two skulls from widely separated parts of the coast is consequently of unusual interest. Unfortunately both specimens come with the sketchiest data.

One was presented to the University by the Rev. G. H. Raley who obtained it in the vicinity of Bella Bella on an unknown date near 1900. The other was found well above the beach during land clearing operations at Victoria, B.C.

The Bella Bella skull is virtually complete except for the dentition and the tips of the pterygoids and includes the lower mandibles, although these are damaged at the articular end. It is the skull of a subadult individual with the mesirostral suture and even the exoccipito-supraccipito sutures incompletely ankylosed. The mandibles are separate from each other.

The Victoria skull lacks the mandibles and dentition. Measurements of the skulls are given in Table 1. In comparison with measurements of 7 skulls from Bering Island (True, 1910:53) there are no very obvious points of difference except for the depth of the temporal fossae in our specimen No. 3691 where the breadth between the temporal fossae as measured across the occiput is 200 mm. and thus 20 per cent less than in any specimen measured by True.

TABLE I
MEASUREMENTS OF SKULLS OF ZIPHIUS CAVIROSTRIS FROM BRITISH COLUMBIA

	No. 3691 U.B.C. Mus. Zoology MM.	No. 5645 Prov. Museum MM.
Total length of skull	850	890
Length of rostrum	460	495
Height from vertex to inferior border of pterygoids	360+	400+
Length from tip of rostrum to post border of pterygoids	710	720
Length from tip of rostrum to anterior end of nasals	620	650
Breadth between centres of orbits	440	540
Breadth between temporal fossae	200	320
Breadth of rostrum at base	305	300+
Breadth of rostrum at middle	120+	130
Breadth of premaxillae at middle of same	80+	71
Depth of rostrum at middle	80	80
Breadth of premaxillae at front of nares	200	185
Greatest breadth of anterior nares	80	75
Length of temporal fossae	140+	150
Breadth of temporal fossae	90	90
Length of orbit	130	147
Length from anterior end of orbit to maxillary notch	90	100
Length of tympanic bulla		Lost
Breadth of tympanic bulla		Lost
Length of mandible	680+	Lost
Length of symphysis	180	Lost
Depth of mandible at coronoid	130+	Lost

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GENERAL NOTES

An Unusual Occurrence of Turkey Vultures on Vancouver Island.—Fifty-three turkey vultures were seen in slow, wheeling flight over the Oak Bay district of Victoria on October 7, 1951 at 11 a. m. The flock moved southward passing over the coast line in the vicinity of James Bay at an altitude of about 1000 feet. In the later afternoon of the same day seventy-four of these birds were observed over Ten Mile Point. They wheeled over the tall firs at tree top level gradually moving northward up the coast line of the Saanich Peninsula.

Late on the morning of October 8, 125 to 150 turkey vultures passed over the city crossing the coast line in the James Bay area again. These birds were observed by Mr. J. Maxwell of the museum staff. The earlier flocks were watched by Mr. York Edwards, Provincial Parks Wildlife Manager, and the writer.

We were unable to ascertain whether three separate flocks of vultures were represented. It is possible that an accumulation was taking place in the Victoria area, and that the numbers seen by Mr. Maxwell included those observed earlier.

If the movements observed represents a southward migration of nesting birds a much larger vulture population occurs on Vancouver Island than has previously been suspected. On the other hand, a reverse movement may be indicated; the birds foraging northwards from the United States. In any case, we have no previous records of such a concentration of turkey vultures in this area. —C. J. GUIGUET.

The Ancient Murrelet at Mabton, Washington.—I am indebted to my friend Dr. L. C. Wheeting for calling my attention to a strange bird which he had seen in a dry, narrow, deep-sided irrigation ditch on the Yakima Chief Ranch, Mabton, Yakima, County, Washington. When first noticed the bird was alive and making strenuous efforts to fly out of the ditch. A few days later, on Thanksgiving day, November 22, 1951, when we inspected the locality, we found the bird dead and partially eaten. To our surprise it proved to be a female Ancient Murrelet (*Synthliboramphus antiquus*). This species normally occurs in a marine habitat on the coast. In a straight line Mabton lies some 200 miles inland. In preparing the specimen it was found to be in an emaciated condition.

In the November-December issue of THE CONDOR (53:301), Stanley G. Jewett reported finding a live Ancient Murrelet on the railroad tracks at Bend, Deschutes County, Oregon, on November 18, 1950. Bend is some 120 miles from the coast as the crow flies. Jewett mentioned that the bird was possibly blown there during a period of strong winds.

The occurrence if the bird at Mabton can possibly be explained on the same basis, for strong southwesterly winds had prevailed in the area several days prior to the first sight of the bird.—ARTHUR SVIHLA, *Department of Zoology, University of Washington.*

Records of Somateria mollisima v-nigra on the Main Land of British Columbia, Canada

On October 31, 1949, I received from a friend of mine what was supposed to be a large female mallard. During the early part of January, 1950, I learned from a student at the University of British Columbia that I had a female Pacific Eider, and according to Munro and Cowan's Review of the Bird Fauna of British Columbia it was the first eider collected on the main land of British Columbia.

During the fall of 1950 at Alkali Lake I noticed five eiders standing on the ice near a small opening in the center of the lake. I tryed to secure one or two of these birds for the record, but the ice was too thin to carry my weight. The next morning all the lake was frozen over and the eiders had disappeared. Mr. M. Riderman, owner of the large property called Alkali Lake Ranch, noticed the eiders in question, and according to his statements it was the first time to his knowledge that eiders had landed on the lake mentioned.

The Pacific Eider taken six miles east of Prince George, B. C., October 31, 1949, bears the tag number 565 and is 615 milimeters long and weighed six pounds.—LEO JOBIN, *Williams Lake, November* 15, 1951.

Record of Corvus corax principalis for the Cariboo, British Columbia, Canada

During recent years this race of ravens has made its appearance at Horsefly and Quesnel Lake. On one occasion only have I noticed ravens at Williams Lake. This fall I received reports from hunters that ravens were seen from Chilco Lake northwesterly to Anahim Lake in fair numbers. One hunter is reported to have killed five near Anahim Lake in one day. Anahim Lake is situated over 200 miles west of Williams Lake. During the fall and winter small flocks of ravens might be seen following Horsefly River or Beaver Valley northeast of Horsefly in search of carcasses of game animals left behind by hunters.

So far I have been unable to locate any raven's nests in this district. One specimen was collected near Horsefly on October 3, 1949.—LEO JOBIN, *Williams Lake, November* 15, 1951.

Porcupine on the Olympic Peninsula

This is apparently the most northerly record of porcupine *(Erethizon dorsatum Linnaeus)* hitherto reported on the Olympic Peninsula.

In the summer of 1937 a medium sized porcupine was observed closely (quills secured) along the Wynoochee River, Grays Harbor County, one-half mile south of Save Creek (near First Canyon) on the railroad grade. This was observed by several people including the senior author of this note. It was allowed to go on its way.

At this time it was considered unusual; porcupines had not previously been observed by woodsmen in the area. It was reported that a pair of porcupines had been released on Hoods Canal at Hoodsport about 10 years before (unverified); however, that is a considerable distance from the Wynoochee. The wildness of this area precludes the possibility of introduction by human agency.

In August 1951 a porcupine was run over on U. S. 101 at Kalaloch, Jefferson County, and one reported seen near Queets in July or August. (Reported by Floyd Dickinson, Olympic National Park Ranger.) However, these occurences on a major highway with vacationists passing through every day cannot be taken as certain proof of resident population.—ADAMS, SAMUEL E., M.D. and JOHNSON, MURRAY L., M.D., *Puget Sound Museum of Natural History, College of Puget Sound, Tacoma, Washington.*

Sight Record of Willet at Gray's Harbor, Washington

On September 2, 1950, Miss Joan Laval and I observed a Willet (*Catoptrophorus semipalmatus*) on the beach at Oyehut, Gray's Harbor County, Washington. The bird appeared very similar to a Yellow-legs when walking along the upper beach, but its straight bill, general gray color, bluish-green legs and habit of nodding were specifically noted. It was very shy, and when we attempted to approach within collecting range the bird spread its spectacular black-and-white wings, confirming our identification, and flew out over the ocean. We did not see it again. We had the bird under observation for several minutes, and the field marks were unmistakable.—ZELLA MCMANNAMA SCHULTZ, *Seattle, Wash.*

Notes on the Harlequin Duck (Histrionicus histrionicus pacificus), *nesting in the Quesnel River near Likely, British Columbia, Canada.*

Every spring during the past ten years I have visited this colony of Harlequin Ducks nesting at Likely, the outlet of the Quesnel River. This is the only breeding colony of this handsome species in the Cariboo.

The Quesnel River flows from Quesnel Lake, and is fairly large, swift and always clear. The altitude is 2280 feet.

About seven pair of Harlequin ducks are using this same place year after year to breed and raise their young. In general, the males leave the area early in the summer, the females stay with the young until late in the summer and then disappear until the following spring. On May 14th 1950, I collected a drake at Likely, British Columbia.

During the winter months a pair of Belted kingfisher *(Megaceryle alcyon)* and a few dippers take possession of the harlequin breeding ground which is free of ice all year around.—LEO JOBIN, *Williams Lake, British Columbia, Canada.*

A Wolf Record for Washington State

Records of timber wolves in the State of Washington in the last 30 years are extremely scarce. Recent records known to me are of two animals taken on the north fork of the Quinalt River in 1920, two shot at Wahluke, Grant County, on September 17, 1917, one taken in Skamania County in 1924 (Dalquest, W., 1948, Univ. Kansas Public., Museum Nat. Hist. 2, 1-144) and one trapped in May, 1930 at Tonasket, Okanagon County (Milton Webster personal comm.).

The scarcity of the animal and the absence of specimens for subspecific determination makes it interesting to record the capture of a large male wolf in the Kettle Mountains, about 12 miles east of Republic Ferry County, on August 9, 1950. Unfortunately the specimen was destroyed but measurements were taken and the skeleton later salvaged and deposited in the Charles R. Connor Museum at Pullman, Washington.

State Game Protector Melvin Sharp, who took the animal, recorded the following measurements:

> "Height 36 in.; length, not including tail, 36 in.; chest width 16 in.; head, width 10 in., length 12 in., depth 8½ in.; neck width 10½ in.; hind leg, crotch to toe, 27 in.; front leg, chest to toe, 21 in.; front foot, width 4½ in., width stretched 7 in.; body depth 16 in. It was estimated to weigh well over 100 pounds and was a grayish-white in color."

The skull was submitted to Mr. O. Hadley, Jr., Assistant Curator of Mammals at the U. S. National Museum, by whom it was identified as *Canis lupus columbianus*.—S. E. GUENTHER, *State Game Biologist*.

Unusual Behavior of Muskrats and Wild Ducks. The following incident was witnessed in the Clark Fork Valley about two miles west of Missoula, Montana on Nov. 11, 1951.

A pair of Mallards *(Anas platyrhynchos)* and a lone Green-winged Teal *(Anas carolinensis)* appeared to acting strangely in the sluggish back-water of one of the small sloughs that are prevalent in this locality. They were not feeding, yet they appeared unusually active. Continuously, one or another of the three would rise from the water, fly a distance of not more than twenty-five or thirty feet, then flop back to the surface, invaribly swimming toward the original position. So regular was this behavior that at least one duck appeared to be in the air almost constantly. With the binoculars I soon discovered that there were two participants in the strange proceeding. A couple of large Muskrats *(Ondatra zibethicus)* were apparently the cause of all the trouble. It seemed that they were intent on putting the ducks to flight, and the ducks were equally determined not to be driven from the slough. Time after time I watched one of the rats swim purposefully toward a duck, approaching it almost to the point of contact and invariably the results were the same. There appeared to be nothing really belligerent in the attitude of the aggressors—just a desire to disturb the ducks; and the latter—even the little teal, showed no indication of fear. Finally, after, I should judge, eight or ten minutes during which the performance continued without variation, the drake Mallard seemed to tire. Rather sedately he swam to shore and stepped out on the grassy bank. When I left a few minutes later, he was standing with outstretched neck, apparently watching the game which was rapidly losing its intensity. One rat had practically given up the chase and the other seemed half-hearted in its attempts, while both the female Mallard and the Teal were displaying the same lack of concern that was apparent from the beginning—flying only when forced to do so and returning immediately to the original spit.—R. L. HAND, *U. S. Forest Service, Missoula, Montana, Jan. 1, 1952.*

Sight Record of the White-Throated Sparrow (Zonotrichié albicollis) at Spokane, Washington. On March 5, 1949, I had a few hours of leisure in Spokane, and as usual under such circumstances, spent the time in one of the city's many park areas looking for birds. In this case it was Manito Park and the Duncan Gardens area. While watching a flock of Bohemian Waxwings near the extreme south edge of the gardens. I became aware of a familiar bird song coming from a nearby thicket. It was the unmistakable high-pitched, quavery whistle of the White-throated Sparrow, a song that I had not heard since leaving the east, years before. After exercising quite a bit of patience, I was finally able to obtain a clear, unobstructed view of the singer—a typicul adult with clear-cut, square, white throat patch and yellow lores. I did not realize the unusual nature of the observation at the time, since I had noted non-singing individuals of this species in fall on several occasions in western Montana and I was aware that there were numerous records from California and Oregon.—R. L. HAND, *U. S. Forest Service, Missoula, Montana, Jan. 1, 1952.*

BURT, WILLIAM H., and GROSSENHEIDER, R. P. 1952 *A Field Guide to the Mammals.* Houghton Mifflin Co. 200 pp. Cloth, $3.75.

This is a well organized book "giving marks of all species found north of the Mexican Boundary." Its purpose is to identify down to species all animals in this area: no consideration is given to subspecies.

A wealth of material is presented that is useful to the working mammalogist and to the amateurs.

The following criticisms and suggestions can be applied to this work, though they in no way detract from its over-all value.

1—Distribution maps are necessarily small, but could be improved for our Pacific Northwest area by more attention to detail. Particularly the exclusion of Vancouver Island in many cases is noticeable.

2—Certain species of shrews, bats and microtine rodents of the northwest cannot be separated by the amateur. This should be definitely stated in the next.

3—The extensive use of common names for small mammals is confusing; several innovations do nothing to correct this status.

4—Use of the metric system for small mammal measurements would add considerable to the practical use of the book.

Generally, I believe this book should serve the purpose for which it is intended. Naturalists in all fields will want to have this available for ready reference.

—*Murray L. Johnson, Tacoma, Washington*

ROTHSCHILD, MIRIAM, and THEREA CLAY. *Fleas, Flukes, and Cuckoos.* New Naturalist Series. Philosphical Library, N. Y. 1952. I-XIV, 304 pp. 40 halftone plates.

Both writers are experts in the field of parasitology, having published many excellent papers on the subject. The senior author is a member of the famous merchant banker family and a sister of the present Lord Rothschild, himself a well-known zoologist.

In this volume the authors reveal to the general reader a generous glimpse into the world of animal parasites, especially those of the birds of Great Britain. Like the other volumes of the series with which the reviewer is familiar, for example Ford's *Butterflies*, the treatment is solid rather than superficial, and the style is both skillful and entertaining. Emphasis is placed upon parasitism as a widespread biological phenomenon developed through evolution. Although birds have been studied extensively, their parasites, especially the internal fauna, have received only sporadic notice and the authors call attention to the extensive opportunities for research in this field.

Chapter headings include Parasitism, Commensalism, Symbiosis, Effects of Parasitism on the Parasite, Origins of Parasitism and Evolution of Parasites, Fleas, Feather Lice, Protozoa, Worms, Mites, Microparasites, Fauna of Birds' Nests, Skuas, and the European Cuckoo. Also included is a Bibliographical Index, Index of Popular and Scientific Names, General Index, and Index of Scientific Names of Birds mentioned in the Text.

Reading the book calls to mind the confusion which exists among zoologists as to definition of parasite, commensalism, symbiosis, and certain other ecological terms. For example, the authors consider symbiosis to be a close association of different species which derive mutual benefit from the relationship whereas many of us prefer the term mutualism for this. It is common here to use the symbiosis as "life together" without committal as to the advantages or disadvantages to the animals concerned. The authors of this book also broaden the term parasitism to include social parasites such as cuckoos.

Concerning the handicaps of being a parasite, it is stated that "the chances of a grouse roundworm finding a grouse are far less than the reader's chances of becoming the parents of quads, or a cabinet minister." Comparisons are drawn between parasites and their free living relatives in order to demonstrate the evolutionary changes in the former. Numerous examples are given to show the ubiquitous nature of parasitism. Problems of bird relationships are stated to be better understood in some cases if evidence from parasitism is considered. For example, the ostrich and rhea, now placed in separate orders, both are parasitized by species of a genus of feather lice found on no other birds, both have the same two species of mites, and both are hosts of subspecies of a tapeworm not found in other birds.

Protozoans, flukes, tapeworms, and nematodes of birds come in for considerable attention, and the complicated life cycles of the worm parasites are discussed with special reference to variety and possible origins and evolution. It is related that "when flatworms gave up their freedom they certainly began an odyssey compared with which the voyages of Ulysses seem uneventful and commonplace."

Effects of direct parasitism and also transmission of disease organisms by ectoparasites are topics which receive brief treatment. Modification of flies and other groups, including the transition from winged to wingless form and modifications of reproduction receive attention. Bacteria, viruses, fungi and the fauna of bird nests all come in for some discussion, and the chapter devoted to the latter is quite entertaining for it seems that many bird domiciles are inhabited by a great variety of things like beetles, fleas, mites, ticks, moths, springtails, earwigs, booklice, spiders, and what have you. In fact, Nordberg in Finland, they write, recorded 529 different kinds of arthropods from 56 species of bird nests. Therefore it is easy to agree with the authors that "even migration must seem a picnic in comparison with the tortures of nesting days."

The book is highly recommended to biologists, and all others who enjoy learning more about nature. — RALPH W. MACY, Reed College, Portland, Oregon

SOCIETY MEETINGS

JANUARY, 1952—A regional meeting was held in the library of the Pacific Biological Station, Nanaimo, British Columbia, on January 19, 1952. The afternoon meeting was convened at 2:00 p. m., by Regional Vice President G. Clifford Carl. Dr. J. L. Hart, Director of the Station welcomed members and guests.

The minutes of the previous regular meeting were read and approved.

Gordon Pike, Biologist, Pacific Biological Station, spoke on the methods of taking body measurements of whales, and stressed the need of uniformity of technique among workers in this field.

Ronald H. Mackay, Federal Wildlife Officer, outlined the status of the Trumpeter Swan in British Columbia, and spoke of the plan to send six birds to the Severn Wildfowl Sanctuary in England.

York Edwards, Biologist in the Parks Branch of the British Columbia Forest Service, spoke on "Some Aspects of Wildlife Management in British Columbia Provincial Parks."

W. Winston Mair, Supervisor, Predator Control, British Columbia Game Commission, spoke on predator control in British Columbia.

The meeting then adjourned for tea, served by members of the Station Staff, after which there was a conducted tour of the new building.

The evening session, preceded by dinner at the Plaza Hotel, featured three films and talks. James Hatter, Chief Biologist for the British Columbia Game Commission, showed techniques in tagging moose, plus some excellent game and scenic pictures; Dave Munro, Federal Wildlife Management Officer for British Columbia, outlined recent population studies of nestion Canada Geese in the central sections of the province; Ronald Mackay concluded the program with a film on waterfowl research.—C. J. GUIGUET, *Secretary, pro tem.*

FEBRUARY, 1952—A regional meeting was held at Vanport Extension Center, Portland, Oregon, on February 15, 1952. Dr. James A. Macnab convened the afternoon meeting at 1:30 p. m. Kenneth M. Walker, Vice President for Oregon, arrived from Tacoma, Washington, a short time later, and assumed the chairmanship.

The program consisted of the following papers: "The Influence of Land Management on Birds and Mammals," by Paul Scheffer; "The Birds of Midway Island," by Calvin Giesler; "The Biology of Peromyscus," by R. R. Huesits; "Habitats of Birds and Mammals in the Three Sisters Wilderness Area," by Ruth Hopson.

After a thirty minute intermission, the meeting reconvened to hear illustrated talks as follows: "Life Cycles of Helminithic Parasites of Birds and Mammals," by Ralph Macy; "Birds and Mammals of Hawaii," by Calvin B. Foulk.

Dinner was served in the tower room at 6:00 p. m., with 52 members and guests present.

The business meeting following dinner was called to order by Vice President Walker. The minutes of the previous meeting were read and approved.

A motion was passed that the Society participate in the meeting of the Pacific Division of the A.A.A.S. at Corvallis, Oregon, during the week of June 17 to 21, 1952.

President Ransom, who was unable to attend the meeting, sent his appointment of members of the nomination committee as follows: Murray L. Johnson, Alex Walker, George E. Hudson.

The following persons were elected to membership: Donald E. Acheson, Paul Keating, and Ray D. Wiseman from Tacoma; Mildred J. Ericson, Thomas H. McAllister, and K. Ellsworth Payne from Portland; R. York Edwards, Victoria, B. C.; Robert T. Orr, San Francisco, California.

The members in the Oregon Region decided to hold their 1953 meetings in February at Corvallis.

Stanley G. Jewett officiated as master of ceremonies after dinner, introducing guests and calling on various members to tell about their habitats and activities.

At 7:30 p. m. the meeting adjourned to the lecture room to hear illustrated talks, as follows: "Birds and Mammals of Hudson Bay," by Ray Albright and Alex Walker; "Bird Distribution in Oregon," by Robert Bratz; "Cascade Bird Notes," by Tom McAllister.—MARGARET A. IVEY.

MARCH, 1952—A regular meeting of the Society was held March 15, 1952, at the College of Puget Sound, Tacoma, Washington at 8:00 p. m.

Members of the Tacoma Zoological Society were guests. Dr. Ostenson introduced and welcomed them.

The minutes of the previous meeting were read and approved.

Mrs. Flahaut read letters from Dr. George Hudson, Dr. James Macnab and Dr. G. Clifford Carl concerning the date for the annual meeting and which date would be agreeable to the various regions. After a brief discussion a motion was made, seconded and passed that the date be left to the program committee to decide.

The following were elected to membership: Mrs. Elizabeth M. Wright, Seattle, Washington; John C. Hogben, Walla Walla, Washington; and E. Douglas Wood, Vic-

toria, British Columbia.

A letter was read from the secretary of the A.A.A.S. asking that our completed program, which is to be part of the Annual Convention in Corvallis, be completed and submitted by May 1, 1952.

Two petitions nomination Olaus Murie and Kenneth Racey to Honorable Life Membership in the Society were read by the secretary.

The Nomination Committee made the following report:

President—Garrett Eddy
First Vice President—Gardiner Jones
Vice President for British Columbia—James Hatter
Vice President for Inland Region—Thomas Burleigh
Vice President for Oregon—Robert Storm
Secretary—Burton Ostenson
Treasurer—Charles Yocom
Trustee, 1955—Ian McTaggart Cowan

The program consisted of the following papers: "Mammals of the Olympic National Park," by Dr. Murray L. Johnson; "Field Notes from Rainier National Park," by Merlyn Potts, Naturalist, Rainier National Park.—MARGARET A. IVEY

SOCIETY MEETINGS, 1952-53

SEPTEMBER 27.—Field trip to Mt. Rainier, evening meeting at Pacific Lutheran College, Tacoma, Wash.

OCTOBER 11.—Vancouver, B. C.

DECEMBER 3.—Seattle.

JANUARY 17.—Seattle, Game Division.

FEBRUARY 1.—Corvallis, Oregon.

MARCH 14.—Nomination meeting, College of Puget Sound, Tacoma.

APRIL 13.—Annual meeting, University of Washington, Seattle.

MAY.—Inland Region.

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